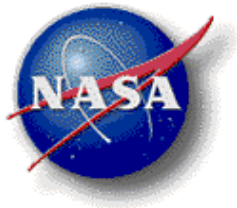


# STATEMENT OF WORK (SOW)

**JT9D-7J Engine Assessment Service Contract**  
SOFIA B747-SP N747NA

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**Date 8/2/2013**



National Aeronautics and Space Administration  
Dryden Flight Research Center  
Edwards, California

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### **1.0 Background**

The National Aeronautics and Space Administration (NASA) currently operates the Stratospheric Observatory For Infrared Astronomy (SOFIA) aircraft at the Dryden Aircraft Operations Facility (DAOF) located in Palmdale, CA. The aircraft is a unique and highly modified Boeing 747SP which houses a large infrared telescope. The SOFIA program has a planned duration of at least 20 years. In order to ensure that enough usable spare engines are available to meet the program duration, NASA has a requirement to assess the condition of eight JT9D-7J engines currently installed on the two retired Boeing 747 Shuttle Carrier Aircraft (SCA). One Boeing 747 SCA aircraft is located at the DAOF in Palmdale, CA and the other is located at Johnson Space Center, Ellington Field, Houston, TX. All assessments must be conducted at these locations.

### **Aircraft Information:**

#### **Type Aircraft**

Engine Type

Location 1

Location 2

#### **Boeing 747**

PW JT9D-7J

Dryden Aircraft Operations, Palmdale CA

Johnson Space Center, Houston TX

### **2.0 Objective**

- Provide an assessment for airworthiness including time remaining of eight JT9D-7J aircraft engines. These engines are currently being used on the B747-100/200 Shuttle Carrier Aircraft (SCA) and are required spares for the SOFIA B747SP aircraft.
- Recertify eligible engines IAW FAA and Boeing AMM Standards and issue an 8130-3 Authorized Release Certificate, Airworthiness Approval Tag for suitable engines.

### 3.0 Scope

- Work to be completed at Johnson Space Center (JSC), Ellington Field, Houston, TX. for Aircraft N905NA and Dryden Flight Research Center (DFRC), Dryden Aircraft Operations Facility (DAOF), Palmdale, CA. for Aircraft N911NA.
- The intent of this contract is to provide an assessment for airworthiness including time remaining of eight JT9D-7J aircraft engines. These engines are currently installed on the B747-100/200 Shuttle Carrier Aircraft (SCA) and are required spares for the SOFIA B747SP aircraft. See attachment C entitled SOFIA Engine data appendix.
- The Contractor shall provide all labor and material to perform the aircraft engine inspections and assessments.
- The Contractor shall provide all required tooling to perform engine Borescope and subsequent inspections culminating with a "C" Check Inspection.
- The Contractor shall provide all required tooling, instrumentation and support equipment, including engine trim analysis equipment to perform engine on wing test.
- The Contractor shall provide all required engineering in support of assessment and repair recommendations.
- NASA will provide qualified engine run personnel

### 4.0 Task

- Perform Water Wash IAW P&W EM 72-00-00 Engine General Cleaning-02 (Engine Gaspath Cleaning)
- Perform engine Borescope inspection IAW Boeing AMM 747 72-00-00/601, Perform AD 2009-04-18 Inspection Vane and Rotor Contact.
- Perform "C" check inspection IAW Boeing AMM 747-72-31-00/601 through 72-31-07/601
- Perform engine on wing performance test IAW Boeing AMM 747 71-00-00/501 test #9.
- Review all associated documents for each engine, including previous overhauls and repairs from original manufactured date or as available documentation allows.
  - Time Since New (TSN), Cycles Since New (CSN), Time Since Repair (TSR).
  - Current status of QEC and accessories, include inventory and records.
  - Review of repair records of each engine module.
  - Review last Test Cell report.
  - Review Engine Condition Monitoring (ECM) Report.
  - Review aircraft and maintenance logs for reported discrepancies and repetitive inspection defects.

- List major components and critical parts installed, e.g., T-1, T-2, Blades, NGV etc.
- Review all previous documented repairs and engineering directives.
- Review all Service Bulletins (SB's) and Airworthiness Directives (AD's) applicable to each engine.
- Remove each engine and install on provided engine stands IAW Boeing AMM 747 71-00-02
- Preserve, wrap and prep for shipping each engine after assessment completed IAW P&W JT9D-7 Engine Manual P/N 770408 Section 72-00-00 Storage.

## **5.0 Deliverables**

- Provide NASA a detailed assessment for 8ea. JT9D-7J engines
- Life Limited Report including TSR, TSN and TSO of each engine module
- Provide a list of discrepancies found on each engine, during the engine and Borescope inspections
- Provide a detailed engine documentation package which includes all repairs, overhaul and maintenance from OEM date or as available documentation allows.
- Provide detailed engine performance acceptance test data
- Provide a detailed summary of incorporated AD's / SB's and recommendations for the implementation of all outstanding AD's / SB's
- Provide a FAA 8130-3 for each qualified engine.
- Provide a detailed recommendation for assessed engine repairs for continued airworthiness
- Provide ROM for assessed engine repairs

## **6.0 Performance / Qualifications**

- The work on the engines shall be performed by a FAA 145 Repair Station
- Repair Station shall be qualify to work with Pratt and Whitney turbofan engines JT9D-7J. The certificate and operations specifications issued to a certificated repair station must be available.

## **7.0 Quality Requirements**

- Documentation

Procurement quality requirements Q-1 Section A: Aircraft Assemblies, Parts and Materials

The Contractor shall ensure the generation and delivery of all documentation as called for in this Contract.

In addition to that documentation specifically called for in the Contract, upon request by the NASA COTR, the Contractor shall make available a copy of any document or data generated during this contract performance for review by the NASA. This includes, but is not limited to, technical reports and memorandums, studies, analyses, parts and materials data, test data.

- Quality Review

The Contractor shall hold a Post Inspection Data Review with NASA at the completion of the assessment.

At the time of the Data Review, documents and analysis to support satisfaction of the requirements of this SOW shall be complete.

- Data Delivery Package

A Data Delivery Package shall be presented for review and delivered at the Data Review meeting. NASA shall have final approval authority over all tests, verification, and documentation.

- Items identified in Section 4.0
- Completed "C" Check Task Cards (developed by contractor)
- Completed travelers stamped/signed quality control documentation
- Inspection Reports/"C" Check Task Cards/quality control document including inspection.
- Engine Borescope inspection documentation including photos.
- Procurement Quality Requirement. See attachment "B" Q1A Section A: Aircraft Assemblies, Parts and Materials

## 8.0 Period of Performance

- Aircraft located at Johnson Space Center (JSC) Ellington Field engine assessment and removal required to be completed by ~~August 31, 2013~~ September 7, 2013.
- Aircraft located at Johnson Space Center (JSC) Ellington Field engine packing for shipment expected to be completed no later than October 1, 2013.
- For the aircraft located at DAOF engine assessment, removal and packing for shipment to be completed no later than October 1, 2013.

## 9.0 Appendix

- Engine Life Limited Components (LLC) document for each engine.